

REMARKS

The Examiner's attention to the present application is noted with appreciation.

The Examiner rejected claims 5-10 and 16-21 under 35 U.S.C. § 112, second paragraph, as indefinite for not specifying means to perform the indicated functions. The rejection is traversed in part. The apparatus claims 5-10 are amended to recite structure under 35 U.S.C. § 112, sixth paragraph. Means to perform a function are not required to be recited in method claims. However, claims 16 and 19-21 have been amended to better recite the steps performed.

The Examiner rejected claims 1-10 and 16-21 under 35 U.S.C. § 102(b) as anticipated by Schwider. The rejection is improper because Schwider's publication date (July 15, 1999) was less than one year before the filing of U.S. Provisional Patent Application Serial No. 60/173,251 (December 28, 1999), to which the present application claims priority and which enables the rejected claims.

Assuming that the Examiner would convert the rejection to one under 35 U.S.C. § 102(a), Applicants provide the attached Rule 131 Declaration to antedate Schwider's publication date.

The Examiner rejected claims 11 and 22 under 35 U.S.C. § 102(b) as anticipated by O'Meara et al. ("O'Meara"). The rejection is traversed, particularly as to the claims as amended. O'Meara discloses a spatial light modulator that modulates phase for the purpose of adaptive correction of a wavefront, which has no effect on dynamic range of the sensor of O'Meara. The present invention is directed to a spatial light intensity modulator and its employment to increase dynamic range of a wavefront sensor. O'Meara neither discloses nor suggests (but rather teaches away from) use of a spatial light modulator in a wavefront sensor either to modulate intensity of light or to thereby increase dynamic range.

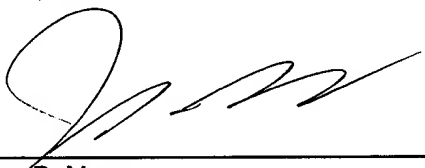
Attached hereto is a marked-up version of the changes made to the specification and/or claims by the current amendment. The attached paper is captioned "Version with Markings to Show Changes Made."

An earnest attempt has been made to respond to each and every ground of rejection advanced by the Examiner. However, should the Examiner have any queries, suggestions or comments relating to a speedy disposition of the application, the Examiner is invited to call the undersigned.

Reconsideration and allowance are respectfully requested.

Respectfully submitted,

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**Version with Markings to Show Changes Made**

In the Specification:

Please amend the paragraph on page 8, lines 1-4, to read as follows:

The preferred embodiment of the invention is shown in Figure 1. In this embodiment the SLM is used in a [transmissive] reflective mode. The sub-array of SLM pixels (such as 12x12) is used to control the illumination of each lenslet or to apodize the subapertures to control [abberations] aberrations within the lenslet subaperture.

In the Claims:

Please amend the claims as follows:

1. (Amended) An adaptive dynamic wavefront sensor comprising:  
a spatial light intensity modulator; and  
a lenslet array.
2. (Amended) The sensor of claim 1 wherein a sub-array of pixels of said spatial light intensity modulator controls illumination of a lenslet of said lenslet array.
4. (Amended) The sensor of claim 3 wherein said spatial light intensity modulator selectively illuminates a subset of all lenslets of said lenslet array.
5. (Amended) The sensor of claim 4 wherein dynamic range of said sensor is increased [by] via means for allowing each lenslet focus to occupy unambiguously a larger area of a detection device, thereby permitting measurement of a larger wavefront tilt.

6. (Amended) The sensor of claim 4 wherein said sensor [samples] comprises means for sampling a wavefront at a variable density of points and frequencies to adaptively determine an optimal scan rate and scan configurations.

7. (Amended) The sensor of claim 4 wherein said sensor comprises means for adaptively [changes] changing temporal frequency to quantify vibration amplitudes and modes.

8. (Amended) The sensor of claim 2 wherein said [sub-array operates to control] sensor comprises means for controlling intensity of a focus of said lenslet.

9. (Amended) The sensor of claim 8 wherein said [sub-array operates to perform] sensor comprises means for performing one or more tasks selected from the group consisting of improving signal-to-noise ratio and changing an effective f-number of said lenslet.

10. (Amended) The sensor of claim 8 wherein said [sub-array operates to apodize] sensor comprises means for apodizing illumination of said lenslet to control aberration content of a beam from said lenslet.

11. (Amended) An adaptive dynamic wavefront sensor comprising:
- a polarizer;
  - pupil relay lenses;
  - a spatial light intensity modulator;
  - a lenslet array;
  - a CCD camera receiving light from said lenslet array; and
  - a polarizing beam splitter receiving incoming light from said polarizer on one side and from said spatial light intensity modulator on another side and sending light to said spatial light intensity modulator on one side and to said lenslet array through said pupil relay lenses on another side.
12. (Amended) An adaptive dynamic wavefront sensing method comprising the steps of:
- receiving light and outputting light with a spatial light intensity modulator; and
  - providing light output from the spatial light intensity modulator to a lenslet array.
13. (Amended) The method of claim 12 wherein in the receiving and outputting step a sub-array of pixels of the spatial light intensity modulator controls illumination of a lenslet of the lenslet array.
15. (Amended) The method of claim 14 wherein in the receiving and outputting step the spatial light intensity modulator selectively illuminates a subset of all lenslets of the lenslet array.
16. (Amended) The method of claim 15 additionally comprising the step of increasing dynamic range by allowing each lenslet focus to occupy unambiguously a larger area of a detection device, thereby permitting measurement of a larger wavefront tilt.
19. (Amended) The method of claim 13 wherein [in] the receiving and outputting [step] steps comprise operating the sub-array [operates] to control intensity of a focus of the lenslet.

20. (Amended) The method of claim 19 wherein [in] the receiving and outputting [step] steps comprise operating the sub-array [operates] to perform one or more steps selected from the group consisting of improving signal-to-noise ratio and changing an effective f-number of the lenslet.

21. (Amended) The method of claim 19 wherein [in] the receiving and outputting [step] steps comprise operating the sub-array [operates] to apodize illumination of the lenslet to control aberration content of a beam from the lenslet.

22. (Amended) An adaptive dynamic wavefront sensing method comprising the steps of:  
passing light through a polarizer;  
with a polarizing beam splitter, receiving incoming light from the polarizer on one side and from a spatial light intensity modulator on another side and sending light to the spatial light intensity modulator on one side and to a lenslet array through pupil relay lenses on another side; and receiving light from the lenslet array with a CCD camera.